NIMA's Requirement: A Level 1 IKONOS Product

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Agenda

- Define NIMA's requirement.
- Show options available for new product.
- Show anomalies that exist with some options.
- Summary

Available Products

(to General Public)

- Carterra™ Geo — Radiometric and Geometric Corrected
- Carterra™ Reference
- Carterra™ Map
- Carterra™ Pro
- Carterra™ Precision
- Carterra™ Precision Plus

Orthorectified

NIMA's Requirement

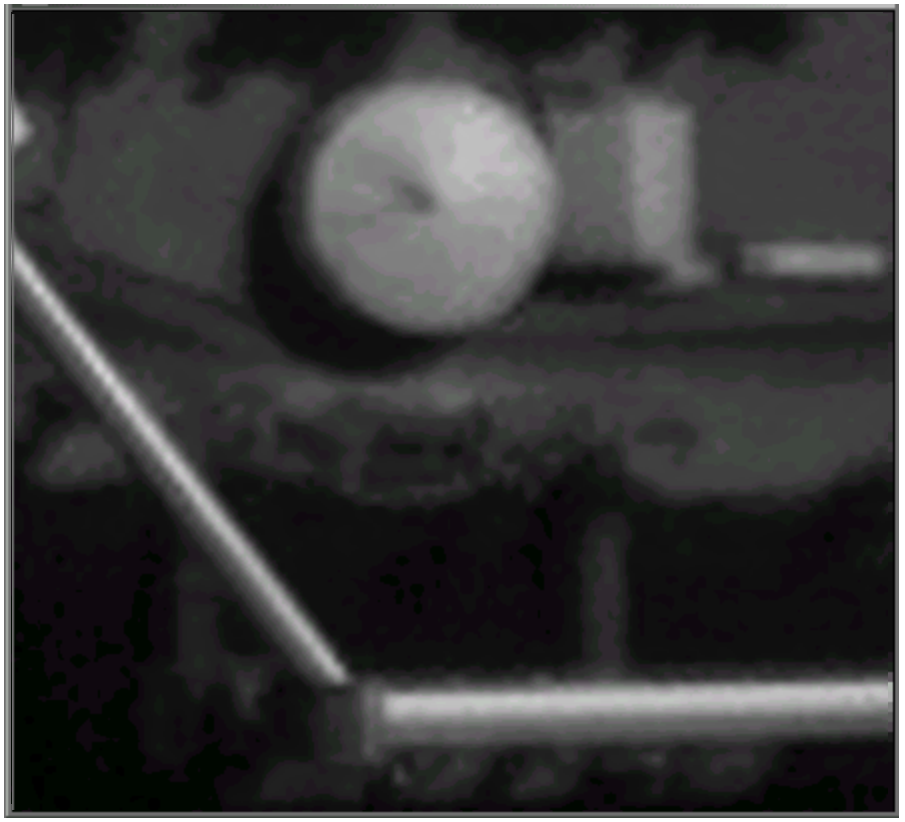
- NIMA required a product that would maintain radiometric fidelity for spectral applications.
- A product that would have minimal processing applied.
  - Less than Carterra™ Geo
- New Product : Radiometrically Corrected only (Level 1).

Variations of Level 1 Product

- Two processing parameters can be defined by the customer
  - Resampling method
    - Nearest neighbor, Bi-linear, or Bi-cubic
  - Modulation Transfer Function Compensation (MTFC)
    - On or Off

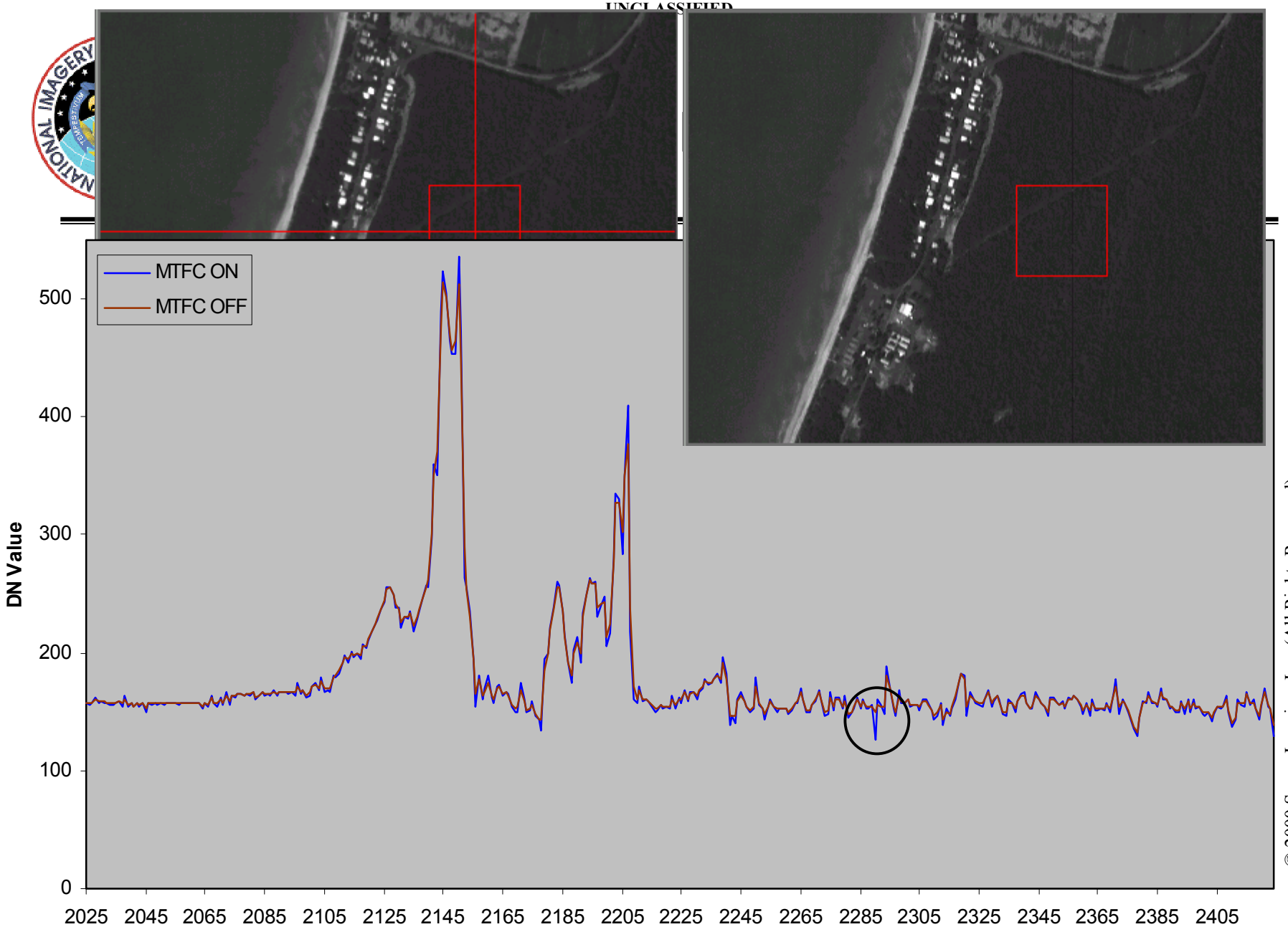
Resampling

- Process of interpolating the value of a transformed pixel.
  - NN - uses the value of the closes pixel
  - BL – uses values of four pixels in a 2x2 window
  - BC – uses the values of sixteen pixels in a 4x4 window



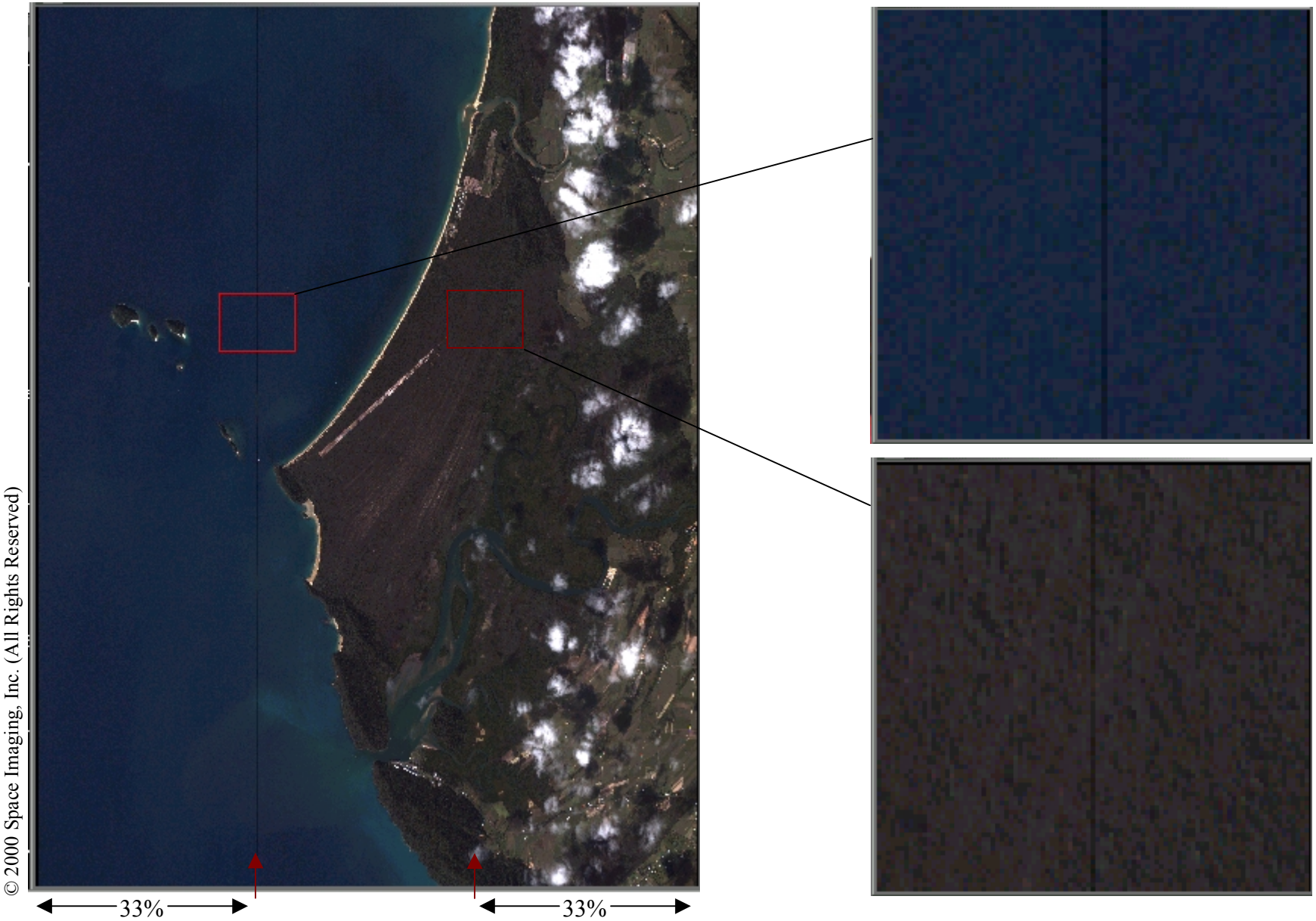
MTFC

- MTFC is an edge sharpening technique used to partially restore image degradation.
  - MTFC OFF
  - MTFC ON



Existing anomalies

- Two anomalies exist with current Level 1 product.
  - Two lines of “data dropout”
    - Only occurs when MTFC is applied with NN resampling.



Anomaly occurs when MTFC is applied with NN resampling.

Existing anomalies

- Two anomalies exist with current Level 1 product.
  - Two lines of “data dropout”
    - Only occurs when MTFC is applied with NN resampling.
  - “Color” pixels

Level 1 – NN/MTFC off

Level 1 – NN/MTFC on

Level 1 – CC/MTFC on

Level 2 – CC/MTFC on

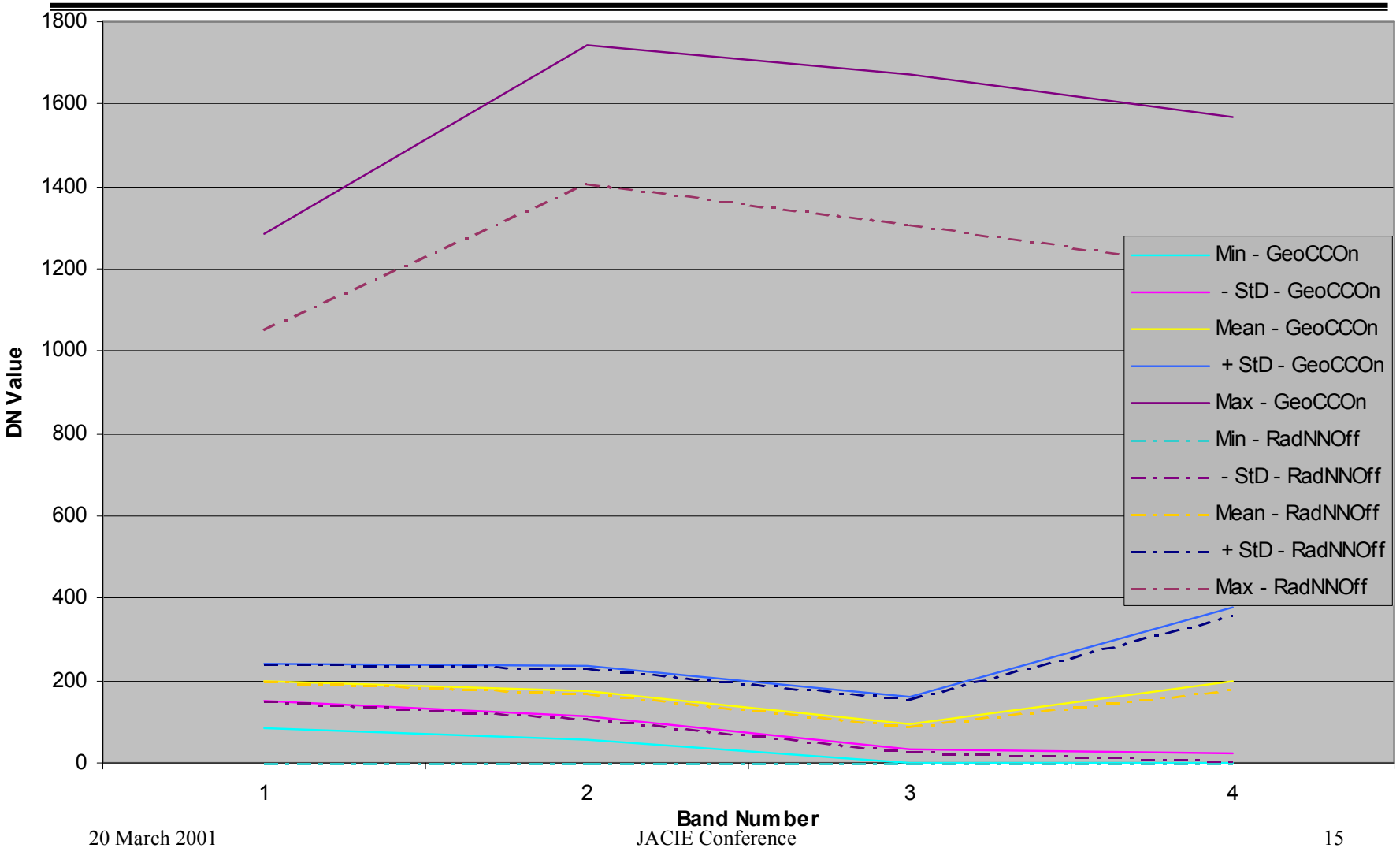
Existing anomalies

- Two anomalies exist with current Level 1 product.
  - Two lines of “data dropout”
    - Only occurs when MTFC is applied with NN resampling.
  - “Color” pixels
- SI expects to fix these anomalies with new array look-up tables that will be implemented soon.

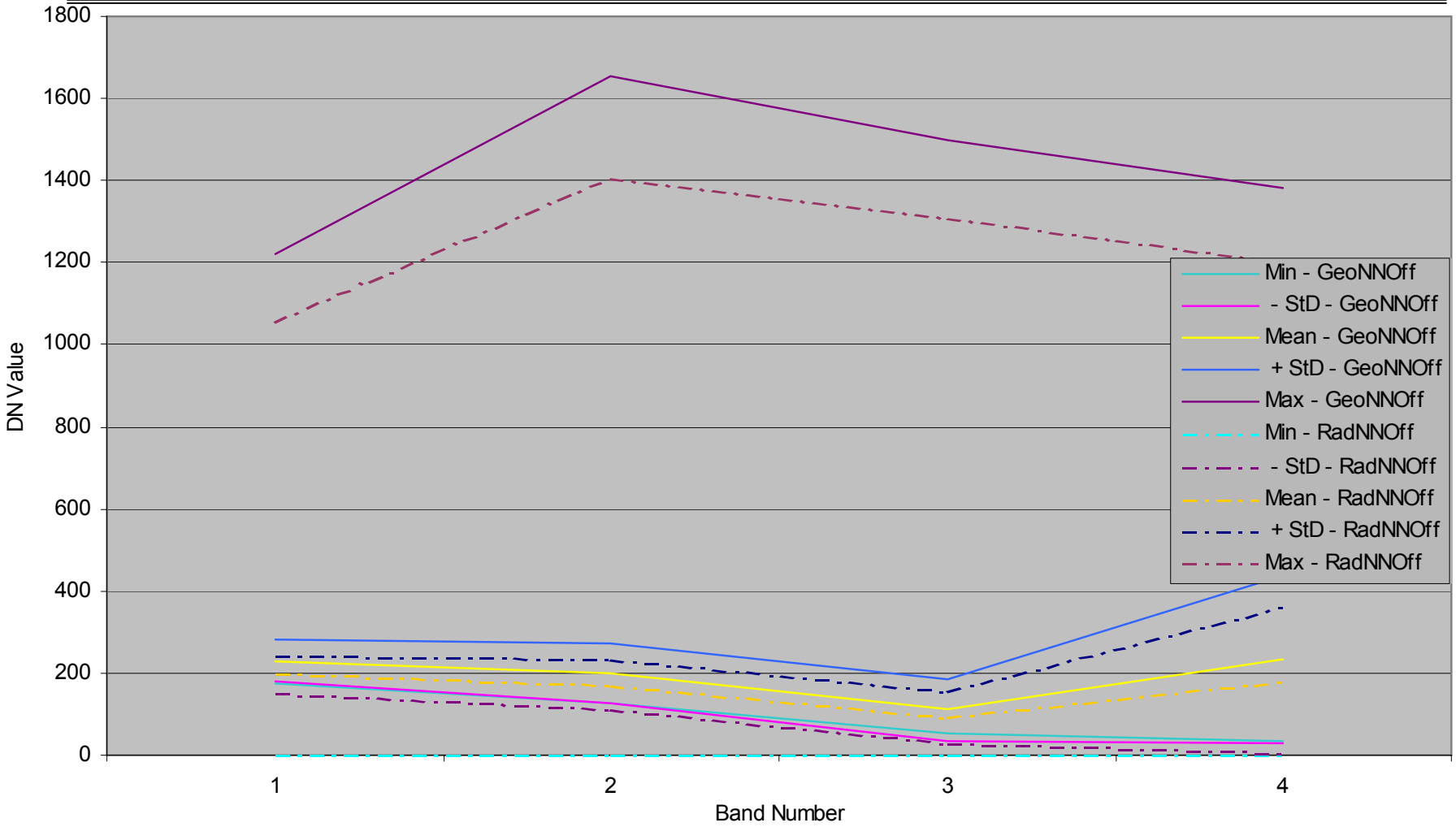
Rectification, Resampling, and Adjustment

	Level 1	Level 2	Level 4
Product Type	Radiometric Corrected	Geometric Corrected	Orthorectified
Rectification	None	Ellipsoid	Terrain
Resampling	Synthetic Array	Map Projection	Map Projection
# of Resamplings	1	1	1
Block Adjustment	No	Yes	Yes

Statistical Comparison
Level 1NN vs. Level 2CC Product



Statistical Comparison
Level 1NN vs. Level 2NN Product



Summary

- A new product is available that preserves the radiometric fidelity.
- SI is working to fix the two anomalies outlined in the briefing.
- We need to evaluate other options that maintain radiometric fidelity while providing some geometric information.
- It is SI's position that MSI data should be processed with MTFC.

Product Accuracies*

Carterra Product	CE90(4)	RMS	NMAS(1)
Geo(2)	50.0 m	23.3 m	1:100,000
Reference	25.4 m	11.8 m	1:50,000
Map	12.2 m	5.7 m	1:24,000
Pro	10.2 m	4.8 m	1:12,000
Precision	4.1 m	1.9 m	1:4,800
Precision Plus(3)	2.0 m	0.9 m	1:2,400

Notes:

- Meets National Map Accuracy Standard for scale shown. Pixel size is 1 m.
- Geo products are not orthorectified; accuracy values do not include effect of terrain displacement.
- Precision plus does not have standard pricing.
- CE90 values are control, others are reference.

¬ Values acquired from Space Imaging website.